

**Overarching Conclusions**

# **WORLD WATER WEEK**

in Stockholm,  
August 21–27, 2011



**Responding to Global Changes:  
Water in an Urbanising World**

[www.worldwaterweek.org](http://www.worldwaterweek.org)



## Table of Contents

Building a Water Wise Urban World	3
Overarching Conclusions	4
Rapporteur Theme Reports:	
Coping with Climate Change	7
Balancing Competing Demands	11
Responding to Socio-economic and Demographic Changes	14
Ensuring Human and Environmental Health	19
Urban Areas in a Landscape Context	22
The Stockholm Statement to the Rio+20 Summit	25
Convening Organisations	26
2011 Stockholm Water Prize	28
2011 Stockholm Junior Water Prize	29
2011 Stockholm Industry Water Award	30
2011 Best Poster Award	30
2011 World Water Week Supporters and Sponsors	31

Cover photo: Istockphoto  
Design: Britt-Louise Andersson, SIWI



This report is published by the Stockholm International Water Institute and printed by Ineko, Stockholm, Sweden.  
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# Building a Water Wise Urban World

The 2011 World Water Week in Stockholm brought more than 2,600 leaders from science, business, government, and civil society to focus new thinking and positive action toward the water-related problems facing our world. The theme for the week was “Responding to Global Changes: Water in an Urbanising World”.

Throughout the Week, experts and organisations explored various issues focused on the central theme, through plenary sessions, workshops, seminars, side events, and panels. Other topics that were covered included transboundary waters, sanitation, food security, water resources management, energy, governance, human rights and agriculture.

For the third consecutive year, the 2011 World Water Week concluded with a Stockholm Statement. At the Week’s closing plenary, the assembled participants called on leadership at all levels of government that will participate at the Rio+20 Summit (4-6 June, 2012) to commit to achieving “universal provisioning of safe drinking water, adequate sanitation and modern energy services by the year 2030” and to adopt intervening targets to increase efficiency in the management of water, energy and food.

As the organiser and host of the 2011 World Water Week, the Stockholm International Water Institute (SIWI) has prepared and published these overarching conclusions. The report analyses the issues, initiatives and recommendations put forward during the Week for the benefit of the participants and the global water and development communities.

The Overarching Conclusions in section one are compiled and written by SIWI to try to capture what we feel were the key issues and insights advanced during the week. In the second chapter, five teams of senior and junior rapporteurs offer their narrative on five thematic streams that they’ve been tasked to cover during the week, whereas the final chapter gives an overview of the incredible work of prize laureates and award winners.

The primary goal of the World Water Week is to provide an annual focal point for solutions to the growing array of water and development challenges facing the world. We welcome you to visit the website, [www.worldwaterweek.org](http://www.worldwaterweek.org), where you will find a rich resource of presentations, videos and a host of other materials from each of the sessions that took place during the Week.

I would like to thank all of you – convening organisations, participants, sponsors and partners – for your role in making the 2011 World Water Week in Stockholm a tremendous success. We sincerely hope you can join us next year, August 26-31, 2012, when our theme is “Water and Food Security”.



Photo: Thomas Henriksson

Anders Berntell  
Executive Director  
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Photo: Simola Marco, finalist 2011 WIN photo competition, www.waterintegritynetwork.net

## Overarching Conclusions

At the 2011 World Water Week in Stockholm, over 2,600 global experts gathered to discuss solutions to ensure water security for present and future cities. As the event organiser, the Stockholm International Water Institute offers its conclusions on the key threads that emerged from the Week, based on the summary reports from workshops, seminars, plenary speakers and the rapporteur theme reports (see next section of this publication). This interpretation of the most meaningful and recurring messages that emerged from over 100 sessions is meant to contribute to a dialogue between and beyond the intense and fruitful discussions during the World Water Week.

### Water in an urbanising world

The theme for the 2011 World Water Week was “Water in an Urbanising World”. Over half of the world’s people are currently congregated in cities. By 2050, urban residents will account for 80 percent of all people on the planet and will outnumber our entire global population today. A majority of the people migrating to and being born in cities are in regions that already are experiencing water stress. This will shift the dynamics of where and how water, finances and all other resources will flow to meet domestic, industrial and agricultural needs. Urban development will need to be matched by wise allocation and more efficient use of local water resources and an unprecedented expansion of smart infrastructure.

The scale of urbanisation poses monumental opportunities and challenges. Cities propel growth, foster creativity, build social capital and could provide a platform to develop structures, societies and economies that are more resilient to disaster and more resource efficient. Dense settlements provide economies

of scale that allows for infrastructure investments to serve more people at lower cost, and re-use water and waste to regenerate valuable resources like nutrients and clean energy. To do this requires investments, planning and governance systems that can keep pace with growth. In many parts of the world there is clear evidence that this is not the case. As cities look to chart a path to a prosperous and sustainable future, focus should be put on the following four key areas to ensure real progress.

### Link water with urban planning and design

The scope of challenges facing modern day mayors, urban planners, water managers and all others involved in shaping and governing urban centres are more intense, intricate and expansive than ever before. Cities in dry regions that plan for their immediate, mid- and long-term futures can avoid potential disasters and near certain economic disruption from shortages of water. They can choose smarter paths where they are prepared for droughts and floods and avoid losses before they come. They can opt to generate net gains by retaining, recharging, and reusing more water throughout the city and sending less pollution and resources down the drain. Over time, this will lead to improved quality of life, a healthier natural environment, and more sustainable economic growth. Numerous examples of cities that have successfully built sustainable water infrastructure and installed smart management structures, ranging from Singapore, Stockholm, Milwaukee, Seattle, and Seoul, provide models for other cities to learn from and emulate.

While Integrated Urban Water Management (IUWM) is not a new idea, multiple examples were presented during the Week from cities across the world that were successfully engaging in

approaches to integrate water supply, transport, housing, urban drainage, flood plain zoning, forecasting, stormwater harvesting, wastewater reuse policy and planning. There are a host of emerging water technologies, ranging from solar desalination to new flood water storage systems and water recirculation systems for skyscrapers, but the technological solutions that work best will be those that benefit many sectors instead of one. Innovation should build on potential synergies of water, sanitation, and energy for agricultural and urban users.

There is considerable scope to better assess the impact of previous investments made in water infrastructure, especially in informal settlements, and to better evaluate cost-efficient options for the future. Significantly more attention is needed on how best to manage aging infrastructure. More accurate and efficient leakage detecting devices are under development. Choices and incentives are needed to inspire cities, communities, individuals and nations to invest in water conservation and clean water and sanitation provision. There are many examples on how this has been done, such as in Beijing, where drainage systems and stormwater harvesting have been promoted as flood control and water reuse measures to stimulate city-wide infrastructure investments. India's point system on outcomes and processes to rate cities' sanitation, is another example that has facilitated city-to-city competition on investments in sanitation and created emotional and commercial incentives (city-branding) to invest in effective sanitation solutions.

Dialogue between architects and water managers enables synergistic planning and multiple uses of infrastructure. Cities often choose to build striking pieces of architecture to bolster their skyline, profile and identity. Leading architects could be commissioned, as part of a team, to design green infrastructure, such as water retention parks that soften the structural rigidity of cities. This would help cities brand themselves as forward-looking, sustainable centres for future growth while providing essential infrastructure.

### **Integrating and investing in informal settlements**

Most of the urban expansion will occur in developing countries, where well-serviced centres are surrounded by expanding stretches of subserviced suburbs and slum areas that can house up to 70 percent of the population. Today, there is no international consensus on how to define where "urban settlements" begin and end. In many places peri-urban areas are left off the map and are neglected within city planning and service provision schemes. Different concepts and models for what constitutes which part of the city (city proper, agglomeration, metropolitan models) can lead to unclear assignments of responsibility and impede evaluation and execution of the necessary investments. Urban planners need to be better equipped to evaluate the complexity of city models when making decisions over expansion of water and wastewater infrastructure.

To be able to address water scarcity and the inadequate water infrastructure that prevail in many urban areas, it is imperative to deal with a wider set of inequalities within countries. These social inequalities translate into slum areas, and informal sectoral settlements, including peri-urban economies where institutions are weak and social relations often fractured by conflict, internal displacement, and migration. The main challenge is to improve the physical and social infrastructure in these vulnerable areas in a manner that is socially inclusive and sustainable.

Previous strategies for urban development simply cannot be replicated in the least developed countries where industrial growth does not accompany rapid urbanisation. Many areas are facing a more fundamental problem than the well-documented disconnect between water management and urban planners: they have little to no urban planning at all. Without physical planning of urban space and infrastructure, the opportunities created by the city are lost and the challenges to provide water and sanitation services amplify. Without streets, there are no networks to readily connect urban residents with basic services, including water, sanitation, drainage, public transport and electricity. This means that traditional, centralised methods and models used to provide water and sanitation services will usually not work as envisioned.

Decentralisation of services, has also resulted in the rise of problems of availability and distribution. Affluent residents are connecting to services at a much higher rate than the poor or those from rural areas. Without strategic governance to increase investments, social capital and human resources to ensure connectivity, the crisis of inequitable and unsustainable services will worsen. What is needed is short, medium and long-term planning to acknowledge, incorporate and invest in informal settlements as part of the city. Speakers from several financial institutions highlighted the need to develop institutional capacity to design and implement financially viable solutions at scale. The benefits of participatory approaches to include local stakeholders within local development initiatives are well documented and an often repeated topic during the Week. The next step is to create mechanisms to identify local leadership within communities and facilitate their involvement in the project development, design and implementation. There is increased scope to tap into the local networks of water and waste entrepreneurs, who can accelerate sustainable sanitation services while generating new income and energy through wastewater recovery.

### **Extending and financing sustainable water and sanitation services**

One in four urban residents lack access to safe water and sanitation. This may be the most fundamental challenge faced to improve human well-being and stimulate development around the world, but it is essential the problem is formulated correctly. Expanding access is not sufficient. Cities must expand, upgrade,



and maintain infrastructure to ensure that sustainable services of adequate quality are available to growing populations.

Sustainable cost recovery schemes require revenue streams that are predictable and transparent, incentives that are consistent with the intended policy goals, and social support mechanisms targeted to the intended beneficiaries. According to representatives of financial institutions, the amount of available capital for investment is not necessarily the key barrier. Service providers often exaggerate the risk of service extension to low-income areas, which makes it difficult for financiers to properly evaluate investment risk for water and sanitation services.

A mix of tariffs, taxes and transfers are needed to finance capital and recurring costs. Where subsidies are needed to ensure affordability to the poor, they must be structured to subsidise access, and not consumption of water. Likewise, a range of incentives are needed and must be applied with careful understanding of the objectives and consequences of their use. Research to understand and map the institutional environment through political economy analysis, including incentives and disincentives of urban water system regulators is needed to form the basis for water projects and policy.

### **Building synergies between water, energy and food**

Following current trends, the demand for water could increase to as much as 40 percent above global supply within two decades. A

majority of the demand for water comes from food and energy production. There are tremendous opportunities to save water and stimulate development by cutting water losses in energy production, by generating energy from water reuse and by reducing the losses and waste of food from the field on its way to the consumer. This would not only save vast amounts of water, it could also improve our ability to feed growing populations and energise our towns and cities. Investment and innovation to convert waste into energy, to promote sustainable urban design and infrastructure, consumer education, improved food supply-chain and overall material use efficiency can cultivate resource-efficient growth.

At the closing plenary of the Week, the assembled participants supported a 'Stockholm Statement to the Rio+20', which places global priorities on ensuring that all governments commit to sufficient investments in safe drinking water and sanitation services and hygiene education for its people and on enacting policy and institutional reforms that create an enabling environment for coherent management of water, energy and food. To do this, the current measurements of economic performance need to be expanded and complemented by indicators on environmental and social sustainability; while economic and social incentives are needed to promote water use efficiency and protect freshwater ecosystems. This is the message that concluded the Week and will be taken forward.



Photo: Roberto Colonello

# Coping with Climate Change

**Lead rapporteurs: Henk van Schaik and Mats Eriksson**

**Junior rapporteurs: Anna-Katharina Deinhard, Rajabu Hamisi, Man Yang and Jan Cherlet**

Photo: Alastair Morrison, SIWI



The impacts of climate change – stronger and more frequent storms, floods, and droughts and shifting rainfall patterns – are felt through water. According to the rapporteur team, the ongoing “climate talk” is now slowly showing signs of “climate walk” as cities, nations, and local communities are engaging in a number of new initiatives to build resilience to a more variable climate. In their report delivered at the closing plenary of the 2011 World Water Week, the team shared their insights on the new progress, trends and tools to cope with climate change.

## **What is new in the ongoing ‘climate talk’?**

**Water is now on the UNFCCC Agenda...**

Efforts of the water community to highlight the importance of water under the UN Framework Convention on Climate Change (UNFCCC), such as the 2009 Stockholm Statement to COP-15 and the ongoing work of Water and Climate Coalition (WCC) have resulted in the formal inclusion of water as a point on the Nairobi Work Programme agenda on adaptation. The African Minister’s Council on Water (AMCOW) is committed to raise

## **In short**

### **What is new in the ongoing ‘climate talk’?**

- Water is now on the UNFCCC Agenda which means that water experts are needed in the UNFCCC

### **What were the most promising signs of “climate walk” shared during the Week?**

- Climate-proofing is going mainstream
- Improving capacity in modelling and mapping
- Institutional growth

### **What has not changed in our ability to cope with climate change?**

- The gap between national policies and local adaptation practice
- Vulnerable populations in informal settlements

### **How can communities, cities and countries move from climate ‘talk’ to ‘walk’?**

1. Capacitate users to use Early Warning Systems
2. Create coherent financing criteria
3. Start “climate smart” city and land use planning
4. Strategic intervention planning to increase adaptive capacity in informal settlements
5. Make green investments in storage, treatment, and clean sanitation services
6. Take triangular approaches
7. Build knowledge-based platforms to enhance capacity for disaster resilience
8. Walk now – Start with the easy steps first

adaptation higher on the UNFCCC agenda so that corresponding increases in funding are allocated for adaptation projects in developing and vulnerable regions.

**...which means that water experts are needed in the UNFCCC**

The UNFCCC is now seeking increased involvement of water experts to clarify the linkages between water management and the mitigation of greenhouse gas emissions and to contribute to the Nairobi Work Programme (NWP) on impacts, vulnerability and adaptation to climate change, especially in urban areas and utilities. It was recommended that both the water and climate communities engage with urban planners to improve early warning systems for climate-induced hazards in urban areas.

## **What were the most promising signs of “climate walk” shared during the Week?**

The rapporteur team picked up on three generally positive trends that will influence overall capacity and applied approaches to climate change adaptation.





Photo: Guru Thilak

### **Climate-proofing is going mainstream**

Many local, national and regional agencies in Asia, Africa, Australia, Europe, Middle East and in the Americas are committed to mainstream “climate change” and “disaster risk management” into their projects and work-streams, rather than designing specific projects to address adaptation to climate change. Several speakers, however, stressed that this approach poses a trade-off that needs to be clearly understood. Unless adaptation, with water as the common denominator, is perceived as a core-management responsibility within each project and institution, then mainstreaming can potentially lead to fragmented knowledge, poorly coordinated and insufficient responses to climate disturbances.

### **Improving capacity in modelling and mapping**

Technological innovations, using satellite based information and other data in the public domain enable more accurate assessments of the potential future impacts of climate variability on hydrology and water resources at the basin level.

### **Institutional growth**

Both funding for climate adaptation and the number of international, national, and local institutions working on water-related climate adaptation are increasing. At the same time, insufficient capacity at the local level, especially in developing

areas, and inadequate support from national and international agencies, often impede the implementation of projects on the ground.

### **What has not changed in our ability to cope with climate change?**

Multiple presentations during the Week reiterated that diverse, context-specific responses will be needed to cope with climate change. “Best-practice” adaptation methods must be crafted and tailored to function within the specific political, cultural and physical conditions at the local and/or national level. More effective policies and projects for climate adaptation will require improved efforts to focus on the following two priority areas.

### **The gap between national policies and local adaptation practice**

Policies and strategies taken by central governments are, and will continue to be, frequently disconnected for local climate adaptation practices at the local level unless concerted efforts are made to address the root cause of the problems. Fragmentation of water governance is long standing, and is compounded by poor coordination mechanisms, insufficient financing, inadequate knowledge dissemination and communication and often non-existent municipal-level policies for climate



adaptation. Bridging the gap will require improved coordination between institutions (including planning authorities, utilities, municipal services, waste collection, etc.) and new mechanisms to integrate indigenous knowledge on how to respond to extreme weather events that exists within communities into policy development.

#### **Vulnerable populations in informal settlements**

Rapidly growing informal settlements, which are often peri-urban or using marginal land such as urban river shore-lines, coast lines, or in industrial areas, are especially vulnerable to disaster, droughts, and floods. Of the many frameworks, tools, and methodologies addressing climate-induced hazards under development, none target informal urban settlements directly. These areas mount particular challenges since adaptation interventions have to function in the absence of strong government control, a financial base and functional water supply and sanitation services.

#### **How can communities, cities and countries move from climate 'talk' to 'walk'?**

Reshaping towns, businesses, institutions and societies that are more resilient to storms, floods, droughts and less predictable weather patterns is no simple task. After listening to dozens of new presentations on the topic, the team identified eight essential steps put forward during the Week to help everyone better cope with climate change.

#### **1. Capacitate users to use early warning systems**

Early warning systems are needed to provide tailored climate information on floods and droughts for water managers on the national, municipal, and household level, in both formal quarters of the cities and in informal settlements. This must be matched by wide-scale efforts to provide the necessary training and equipment for local professionals to receive and react to the information provided.

#### **2. Create coherent financing criteria**

Incoherent financing criteria, and uncoordinated facilities, between international funding institutions and among private investment funds slows the mobilisation of financing for projects to begin on the ground.

#### **3. Start "climate smart" city and land use planning**

In urban areas climate-induced hazards need to be met by proper design and management of water supply and drainage. This can be achieved by:

- Holistic planning, design and management of infrastructure that includes multi-objective assessments of disaster-risk,
- Integrated urban water management and integrated urban flood management plans and
- Use public investment planning and develop cost-benefit analysis that include economic incentives to invest in disaster risk prevention during the assessment and planning of current and new infrastructure and construction projects.



"Insufficient information or inadequate science is not a viable argument to delay concerted action to improve local capacity to manage increased climate variability" said lead rapporteurs Dr. Henk van Schaik and Dr. Mats Eriksson at the Closing Session.

#### 4. Strategic intervention planning to increase adaptive capacity in informal settlements

Informal settlements will require different strategies for interventions than planned parts of the city. Development projects in urban environments should include adaptation plans for informal developments as well as for the rest of the city. Partnerships between cities can improve sharing of plans and experiences on how to improve resilience in challenging settings, but in general there is a tremendous need to create decentralised adaptation approaches that can be applied in informal settlements.

#### 5. Make green investments in storage, treatment, and clean sanitation services

There are several opportunities to synchronise and synergise economic and environmental policy to ensure green growth, beginning with assigning a cost to pollution and/or over-exploitation of scarce natural resources. Increased climate variability will augment the requirements for water storage between periods of ample water availability to periods of water scarcity. Investments in water storage, water supply and sanitation services, and locally appropriate decentralised wastewater collection and treatment should be prioritised within funds to stimulate green growth.

In growing urban centres, expanding groundwater storage capacity can ensure that cities can provide water for drinking and household use, for industry, energy and cooling and to stabilise infrastructures.

#### 6. Take triangular approaches

Investing in adaptation can be an opportunity to develop local economies. To unlock the potential for development opportunities that can arise in responses to climate change, the current dialogue on adaptation approaches currently taking place between science and policy makers needs to be expanded into a “trialogue” between fund providers (from the public and/or private sector), policy makers and local communities.

#### 7. Build knowledge-based platforms to enhance capacity for disaster resilience

Knowledge based platforms for interaction between urban planners in vulnerable locations, such as coastal cities, mountainous and arid areas, are needed. Additional platforms for water, wastewater and energy cycle management, and for mayors of flood prone cities, to communicate with national meteorological and hydrological organisations can help cities to be better prepared for extreme weather events.

#### 8. Walk now – start with the easy steps first

Insufficient information or inadequate science is not a viable argument to delay concerted action to improve local capacity to manage increased climate variability. In all places, no regret or low regret activities should be implemented right away, such as developing early warning systems (especially for informal settlements).



Photo: Global Water Partnership



# Balancing Competing Demands

**Lead rapporteurs:** Bertha Darteh and Sarantuya Zandaryaa

**Junior rapporteurs:** Kristian Holmberg, Maria Antonelli, Darcy Parks and Kenge Gunya

Photo: Biswas Supriya, finalist 2011 WIN photo competition, www.waterintegritynetwork.net



Allocation and re-allocation of water will become one of the biggest challenges following the increasing urbanisation trends with their corresponding changes in the demands on water. Understanding the value of water for different contexts will allow us to allocate water wisely. The World Water Week showcased different tools and approaches under development and started to explore how they fit together by addressing a variety of needs. A summary of presentations and discussions in the sessions are presented in this report.

## **What new trends did you find in the approaches to balance competing demands?**

The rapporteur team highlighted three encouraging developments in water management approaches, tools and discourse presented during the Week.

### **Advancements in methods and modelling**

Several new or improved methods to help assess competing demands and project the most beneficial uses of water resources were presented during the Week, such as Strategic Basin Assessment (SBA) that was applied in the Ganges Basin, or

## **In short**

### **What new trends did you find in the approaches to balance competing demands?**

- Advancements in methods and modelling
- Innovations and analysis for water risk management
- Water footprinting takes the next step

### **What is not changing within current discourse on balancing competing demands for water?**

- Silo-oriented approaches and calls to break them
- The need to close the gap between knowledge and implementation
- Slowly shifting perspectives in transboundary water partnerships

### **What is needed to strike a balance between competing demands for water?**

- Strategies to stimulate synergies between water, energy and food
- Better understanding of local priorities – ‘adapt the quantity and quality to the needs’

### **What can be done now to improve our capacity to balance competing demands?**

- Sharpen the tools and consolidate the toolbox
- Build partnerships
- Create incentives for innovation and institutional reform

hydro-economic modelling that is currently being applied in a study of the Euphrates and Tigris Study. Each is useful to estimate potential gains in water efficiency and to assign and compare the value of different allocation choices of water resources, whether it is for irrigated agriculture, industrial applications, environmental flows or other uses. These advancements present opportunities for integrated, cross-sectoral approaches and provide a foundation for information-based dialogue between users. The SBA pointed out the need to develop understanding of the cultural value of water and how it affects allocation in different regions and localities.

### **Innovations and analysis for water risk management**

Assessing water risk has become a prominent concern in the business community. New and improved methodologies and technologies for assessing risk have been developed in collaboration between companies and NGOs over the past year. Different methods have been developed for a range of uses and to address different scales and levels of complexity, ranging from global geographical-mapping and GIS-based technologies, to excel-based company-focused assessments and step by step frameworks



Photo: Ben Barber/USAID

local risk assessments. Each tool highlighted several common points for risk aware and smart corporate water management: water issues are complex and require robust managing processes that are integrated in core business practice and good data fit for both local and global contexts are essential.

#### **Water footprinting takes the next step**

The ‘water footprint’ concept is a useful tool that has rapidly gained acceptance as a method that enables sustainability assessments for business activities. For water footprint assessments to be translated into meaningful actions, the goal must be set at determining a sustainable rather than lowest, water footprint. Many companies are beginning to move beyond quantifying their water footprint and working to develop strategic plans to engage their suppliers; encourage practical response options and to define areas of collaboration between different companies.

#### **What is not changing within current discourse on balancing competing demands for water?**

The following issues continue to pervade the concluding remarks of a number of speakers during the Week, just as they have in years past. While these ideas are not new, they remain crucial to our ability to allocate water wisely.

#### **Silo-oriented approaches and calls to break them**

During the Focus: Water in a Green Economy, Dr Alexander Müller, Assistant Director-General, FAO, summed up the problem nicely. “We have a silo-oriented approach in which all important areas are separated: carbon, species, calories, human rights, health, trade, water, education, etc. In reality, these are

integrated and at the bottom of it we have water”. While calls for building partnerships are not new, they remain essential to build cross-sectoral, multi-disciplinary approaches that connect issues such as health and sanitation, energy, hunger and agriculture to sustainable water management and provide the basis for a green economy.

#### **The need to close the gap between knowledge and implementation**

Targeted approaches to disseminate and utilise knowledge are needed and should not be hidden behind blanket calls to, in general, “raise awareness”. Members of government and politicians, investors, customers, suppliers, local community leaders, NGOs, and other groups use different languages and respond to different forms of argumentation and motivations. Different forms of focused communication, that are understandable and motivational to distinct groups within the spectrum of stakeholders, are needed to catalyse the implementation of projects.

#### **Slowly shifting perspectives on transboundary water partnerships**

There is a gradual change being pushed in the perception of how transboundary waters can be managed. Moving negotiations away from dividing specific volumes of water between parties into discussions on how to generate and share the benefits from managing the water resources remains a challenge. New tools and concepts can help identify opportunities for riparians to increase benefits from shared water, but water diplomacy will remain imperative to build the trust necessary to develop options that maximise the beneficial use of transboundary water resources.



### What is needed to strike a balance between competing demands for water?

There is an overarching need to bring about a paradigm shift from 'gulp' to 'sip' to accompany the movement from resource 'abundance' to 'scarcity'. This would involve that we use, reuse, and share resources more effectively, synergistically and equitably. As we move to a 'sip' society, dramatic improvements in the following two areas would considerably improve local and collective capacity to balance competing demands for water.

#### Strategies to stimulate synergies between water, energy and food

Food and water security are two faces of the same coin. The link with water and food security cannot be put on the back burner. Sustainable intensification of water productivity in agriculture – 'more crops per drop', is the first step. Explicit strategies to build synergies between water, and energy and food production are needed to unlock sustainable opportunities for green economic development. Increasing the productive use of, and rising demand for, of water, energy and food resources will require improved governance and increased investments.

#### Better understanding of local priorities – 'adapt the quantity and quality to the needs'

A question that still needs to be answered, is which water quality is fit for which use? Improved knowledge and communication of the cost-benefit of using water of different qualities for different uses, based on effective risk assessment, economic evaluation of the intrinsic value of the use and the cost of risk management will allow decision-makers to more easily craft policy. A framework for different uses of water of different qualities, would allow for opportunities to reallocate and improve the productive uses of water and lower competition for higher quality water.

### What can be done now to improve our capacity to balance competing demands?

The following recommendations were common among presenters throughout the Week. Each of them can and should be prioritised immediately among those who lead the management, allocation and governance of water around the world.

#### Sharpen the tools and consolidate the toolbox

The multi-stakeholder platforms presented provide opportunity for building partnerships through continued stakeholder engagement. The partnerships that have been established for assessing corporate risk, for applying strategic basin assessment tools must be further developed and deepened in order to create trust and consensus on practices as well as to facilitate sharing of experiences and knowledge. A key task for each partnership is to evaluate complementarities and redundancies between the similar tools created by other actors to see if unified approaches based on cooperation among the different methodologies are possible.

### Build partnerships

The role of partnerships in delivering innovation cannot be overemphasised and it was a common thread running through all the presentations under this theme. Partnerships provide methodology for addressing complexity in water management by dealing with the diversity of stakeholders. Opportunities to promote partnerships exist at both the international level as well as the local level. To build effective partnerships we need to understand incentives, motivations, issues of authority and power.

#### Create incentives for innovation and institutional reform

Innovative scientific and institutional approaches are needed to evaluate best approaches to meet competing demands. This encompasses building and balancing new knowledge, information-based multi-stakeholder dialogue, and evaluating strategic and sustainable investments. Institutional performance can be constrained by a lack of incentives, both for institutions and people. Institutional reforms must create incentives for change but this requires political and legal support to make the change happen.

### Reflections from the rapporteurs



Lead rapporteurs: Bertha Darteh and Sarantuya Zandaryaa

#### Above all else, good governance

While there is a drive for innovations in knowledge, technology, financing and incentives to meet the challenges of growing demands caused by rapid urbanisation, good governance remains critical. Balancing competing demands will not only require these but also governance arrangements that bring together all stakeholders given the centrality of water to different strands of social enterprise. New tools such as sustainable water footprinting and hydro-economic models help to support decision-making for good governance.

#### Focus on sustainable funding mechanisms to deliver water and sanitation services

New ways of providing water services to the poor need to be expanded to ensure that their demands for basic services are met. Numerous options and successful examples were presented during the Week, ranging from socialised community funding, revolving funds, user fees, micro-financing, private concessions (e.g. Manila Water) to clean development mechanisms.

# Responding to Socio-economic and Demographic Changes

**Lead rapporteurs:** Sara Ahmed and Graham Alabaster

**Junior rapporteurs:** Janine van Tonder, Britta Olsson, Abdullah Soomro and Paul Quinn



Photo: Annie Strand

## **What new trends and ideas shared during the Week will influence our responses to socio-economic and demographic changes?**

The rapporteur team highlighted three new developments, tools and concepts that are shifting our responses to socio-economic and demographic changes.

### **Urbanisation patterns determine choices for water and sanitation**

Urban and peri-urban growth patterns are complex. Presenters at the Week highlighted the need to understand urban typologies and how they influence the available and best suited options for water and sanitation service provision. Today, there is no international consensus in how to define urban settlements and in many places, peri-urban areas remain invisible and neglected within city planning and service provision schemes. Different

## **In short**

### **What new trends and ideas shared during the Week will influence our responses to socio-economic and demographic changes?**

- Urbanisation patterns determine choices for water and sanitation
- More participatory tools and approaches to better understand urban differentials
- Human rights help define universal access and the required investments

### **What is needed to craft sustainable responses to socio-economic and demographic changes?**

- Policy design that understands the socio-economic status of poor people
- Incentives to improve water services and quality
- Expanded monitoring systems that share information across boundaries
- Bundled infrastructure services and integrated policy responses
- Truly participatory planning

### **What can be done now to improve our capacity to balance competing demands?**

- Pay special attention to fragile, post-conflict communities
- Invest in urban youth
- Benchmark quality, design and processes of water and sanitation management
- Clarify, coordinate and converge institutional responsibilities
- Expand multi-stakeholder platforms for accountability (online)
- Advocate the value and need of urban sanitation by documenting costs of inaction

concepts and models for what constitutes which part of the city (city proper, agglomeration, metropolitan models) can lead to unclear assignments of responsibility, impede proper evaluation and execution of the necessary scope of investments. Urban planners need to be better equipped to evaluate the complexity of city models when making decisions over expansion of water and wastewater infrastructure.

### **More participatory tools and approaches to better understand urban differentials**

There is considerable scope to better assess the impact of previous investments made in water infrastructure, especially in informal settlements, and to better evaluate cost-efficient options for the future. Several examples of new monitoring and mapping tools demonstrated during the Week, including from Kenya, Tanzania and India, show promise. For example, a new participatory, 3-D



Geographical Information System (GIS) based tool has been developed that can visualise and disaggregate layers of data on city boundaries, non-served areas, socio-economic status, distribution of water points and other inputs. This enables planners to identify gaps and overlaps in water and sanitation services and analyse opportunities for cost-effective management responses. The programme also allows for project updates to be easily shared on web-portals between sectors and with the public. Hydro-economic modelling, which takes spatial and temporal variation as well as location-specific social regulations into account to assign value for different uses of water, is another emerging tool to evaluate different water management options to respond to shifting needs and demographics within urban and rural areas.

#### **Human rights help define universal access and the required investments**

Human Rights Based Approaches (HRBA) are in the process of being more accepted since the 2010 United Nations Resolution affirming the right to water. HRBA consists of 10 normative and cross-cutting criteria developed by experts to define access to clean water and sanitation, including the affordability, quality, non-discriminatory practices, participation, and accountability of the service provision. These criteria can guide water and sanitation monitoring processes and have the potential to

transform leadership at all levels, to empower civil society to engage with water rights and to facilitate women's participation in water governance.

#### **What is needed to craft sustainable responses to socio-economic and demographic changes?**

A number of presentations made during the Week returned to the following five requirements for improved responses to socio-economic and demographic changes.

##### **Policy design that understands the socio-economic status of poor people**

To be able to address water scarcity and the inadequate water infrastructure that prevail in many urban areas, it is imperative to also deal with a wider set of inequalities within countries. These social inequalities translate into slum areas, and informal sectors of settlements, including peri-urban economies where institutions are weak and social relations often fractured by conflict, internal displacement, and migration. The main challenge is to improve the physical and social infrastructure in these vulnerable areas in a manner that is socially inclusive and sustainable. This will require political commitment and investments from governments as well as new thinking on collaborative partnerships.



Photo: G.M.B. Akash, winner of 2011 WIN photo competition, [www.waterintegritynetwork.net](http://www.waterintegritynetwork.net)

Decentralisation of services has also resulted in the rise of problems of availability and distribution. More affluent residents are connecting to services at a much higher rate than the poor or those from rural areas. Without strategic governance to increase investments, social capital and human resources to ensure connectivity, the crisis of inequitable and unsustainable services will worsen. To implement strategies for sustainable development and management of water resources it is necessary to recognise the changing role of the government from service provider to facilitator of change.

### **Incentives to improve water services and quality**

Authorities must begin to treat water services not only as a public good but as a commercial enterprise through a process of corporatisation (not privatisation). This process would place a commercial incentive on addressing issues such as quality, deficient delivery of resources, overloaded networks and high leakage rates. Ultimately, it must ensure that the business of monitoring is part of the service delivery. Such systems could be achieved through the adoption of mobilisation strategies, putting in place structures to meet water needs and identifying the willingness to pay. Water billing is essential, but the specific conditions of the poor must be linked with the solution. There is scope for the participation of the private sector in such ventures, but their involvement must be regulated. Social audits, the right to information legislation, community report cards and social and gender budget analysis of the water sectors are tools that can be used more systematically and at scale by civil society to ensure that public-private partnerships work in the interests of both the poor, particularly women, and sustainable water resource development and delivery.

### **Expanded monitoring systems that share information across boundaries**

Despite increased attention within the donor community to the importance of monitoring outcomes, learning from the past, increasing collaboration and sharing knowledge between partners, there is more work to be done to develop consistent indicators for what is monitored and how it should be evaluated in order to increase comparability between sectors, countries, organisations and donors. With aggregated data, some factors that are more difficult to measure are at risk of falling out, including sustainability and equity among others. There is no current real plan on how to address this. For example, the WHO/UNICEF Joint Monitory Program for Water and Sanitation (JMP), which tracks the progress made towards achieving the MDG goals, faces a major challenge to determine which indicators are relevant at the global level and to ensure that they are comparable to national and regional indicators. Global monitoring requires a narrower set of indicators, while more disaggregated information is needed to monitor at the national and local level.

## **Reflections from the rapporteurs**



**Lead rapporteurs: Sara Ahmed and Graham Alabaster**

### **Should we go 'back to basics'?**

An interesting discussion that was repeated in different ways during the Week was whether city wide strategies should go "back to basics" within water and sanitation provision. 'Back to basic' advocates suggested that projects and pilot projects might have more or less played out their roles and proved unsustainable or not applicable on a bigger scale. Once more, governments need to gain recognition as the primary facilitator of services, including expansion of physical and social infrastructure within water and sanitation, to be able to match the speed of urbanisation. This solution can be seen as trying an old recipe since recent decades have seen a rollback of government within water provision, introducing the private sector and market incentives. I do not know whether city wide strategies and government investment implies that a general shift within water policy making is under way or if it is just a discussion subordinated to the general discourse.

### **A wider look into who and why**

One discussion that we felt was missing from the seminars we attended was the context in which individuals, NGOs, recipient countries, corporations and donors work. We would have hoped to see more seminars dealing with the complexity of competing global water agendas, globalisation, shifts in water policymaking, the neo-liberalisation of water policy implementation and what it implies for the water community and possibilities of implementation in the long run. In short, not just where we are going, but why.

### **Political will is only half of the solution**

Presentations, speeches and conclusions for international forums often offer a similar take home message: political will is needed to solve the challenges faced. When we look at water and sanitation challenges, this leaves out the more important half of the story – effective follow through. Take the case of Rwanda, which has now exceeded the sanitation MDG target. Progress has not come because of donor support, external finance, or any new WATSAN tools are lacking. It is a direct result of a presidential decree and effective follow-up by actors at all levels of government and at the household level. The tools are available and in many places there are plenty of good politicians with the political will to make decrees. The greatest barrier usually lies in the ability to follow-up on those decrees at all levels. External support can be more effective if it focuses on helping to facilitate follow-up to political mandates.



### **Bundled infrastructure services and integrated policy responses**

The potential efficiency gains and improved return on investment on smarter water infrastructure and management frameworks are an oft-repeated topic during the Week. But actual examples of implemented responses are rare. Why? The two root causes of the inefficiencies – “silo thinking” of discreet ministerial budgets, departments and policies and lack of political will to implement recommendations of bridging or intermediary organisations – are easy to point out but difficult to address. Research into ‘model cities’ that have successfully built sustainable water infrastructure and installed smart management structures can provide meaningful input for other urban areas to emulate.

### **Truly participatory planning**

Real participation of beneficiaries, where they are engaged in the planning process and not consulted after a plan has been decided, is vital to ensure local development projects lead to the greatest possible improvement in human well-being. While clear challenges exist, in situations where numerous actors with competing interests are present, it is evident that actors operating in isolation not only lead to fragmentation but impair the system’s overall effectiveness. Beyond engaging stakeholders, it is crucial that concentrated action is taken to account for power dynamics between them. Education and participation of all involved stakeholder groups in potential options that provide

benefits for all actors (increasing the size of the pie) is vital to encouraging cooperation, buy-in, equity and engagement.

### **What can be done now to improve our capacity to balance competing demands?**

The following recommendations were common among presenters throughout the Week. Each of them can and should be prioritised immediately for policy makers, local leaders and water and development professionals to align their work to better respond to rapid socio-economic and demographic changes.

### **Pay special attention to fragile, post-conflict communities**

Fragile and post-conflict states suffer the most challenging conditions and have little human capacity to resolve them. Supporting grants for further education and investments to help facilitate a more enabling environment, including the political landscape, are needed. Forums and mechanisms for civil society actors to hold governments accountable on WASH developments are imperative to ensure that commitments translate into results.

### **Invest in urban youth**

Eighty percent of the slums in Africa are populated by people under the age of 18. Paying attention to demographic transitions, such as increasing migration, older populations in rural areas, longer life expectancies and growing economic recession, necessitates finding innovative opportunities for youth to engage in

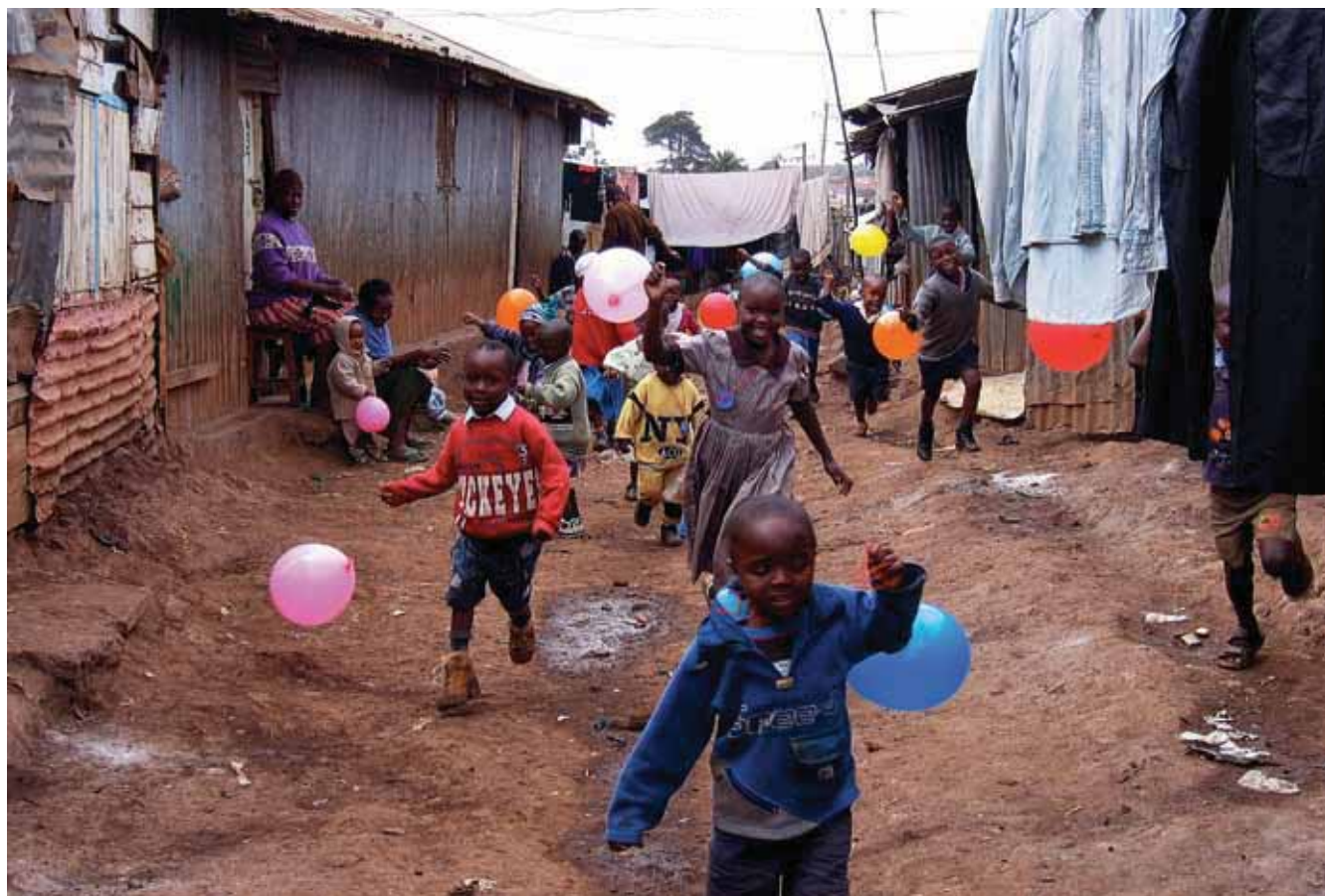


Photo: Amanda Kline

development, education and social change. Unless systematic attention is paid to this, urban discontent, fuelled often by the youth, could affect sustainable water governance.

#### **Benchmark quality, design and processes of water and sanitation management**

Choices and incentives are needed to inspire cities, communities, individuals and nations actors to invest in water conservation and clean water and sanitation provision. There are many examples on how this has been done, such as in Beijing, where drainage systems and stormwater harvesting have been promoted as flood control and water re-use measures to stimulate city-wide infrastructure investments. India's point system on outcomes and processes to rate cities' sanitation, is another example that has facilitated city-to-city competition on investments in sanitation and created emotional and commercial incentives (city-branding) to invest in effective sanitation solutions.

#### **Clarify, coordinate and converge institutional responsibilities**

Research to understand and map the institutional environment through political economy analysis, including incentives (or lack thereof) of urban water system regulators is needed to form the basis for water projects and policy. Greater efficiency in the delivery of water services can be achieved through the

strengthening of national water sector management and assigning clear responsibility to institutions. Water Operational Partnership (WOPs), NGOs and private vendors are the key service providers of water and sanitation to the poor. They have access to resources, knowledge and infrastructure and a partnership between actors can contribute to peer-to-peer learning, efficiency and effective use of resources, funding and knowledge.

#### **Expand multi-stakeholder platforms for accountability (online)**

To have Social Accountability Monitoring, which involves stakeholders, regulators and civil society to publicly ask questions about 1) Who's responsible (for urban water systems), 2) Who's affected, 3) Performance monitoring and 4) Integrity and oversight can help contribute to more transparent, efficient and equitable water allocations.

#### **Advocate the value and need of urban sanitation by documenting costs of inaction**

Continued work to influence decision makers at all levels is needed to increase investments in sustainable sanitation services. Raising the issue in the media, and highlighting the economic gains made through investment are now pushed by the leading sanitation advocates as effective methods.



Photo: Das RajatKumar, finalist 2011 WIN photo competition, [www.waterintegritynetwork.net](http://www.waterintegritynetwork.net)



# Ensuring Human and Environmental Health

**Lead rapporteurs: Dave Tickner and Anjal Prakash**

**Junior rapporteurs: Karin Edberg, Hanna Helsing, Lilian Sahlin and Melissa Denbaum**

Photo: Celine Dubreuil



## In short

### What new learning presented during the Week will help advance human and environmental health?

- Rights-based approaches show promise
- More creative thinking on the ground
- Water and sanitation planning looks into political economy

### What is needed to ensure human and environmental health in an urbanising world?

- Innovative communication
- Better data in the public domain
- A stronger science, society, policy interface

### What steps can be taken right now to improve human and environmental health?

- Governments should combine soft and hard solutions
- Private sector strategies to target low-income consumers in urban areas
- NGOs need to make comprehensive links between disciplines and continue to provide examples of what works for environmental and human health
- Focus science on knowledge application

Ensuring human and environmental health is a remarkably broad topic – taken literally, it could include almost everything in the whole World Water Week agenda. This report interpreted human health broadly, to include not just the physical wellbeing of people, but also the way in which water resource management can help to increase their social and economic “health”. Throughout the Week, the rapporteur team compiled the most interesting cases and evidence of specific ideas and measures which could help enhance both human and environmental health and actions that have delivered impacts on the ground.

### What new learning presented during the Week will help advance human and environmental health?

Very few ideas presented were truly new. Most new learning emerges from a number of examples where many ideas and experiences were either renewed (i.e. resurrecting old, sometimes forgotten ideas) or nuanced (i.e. new variations on existing themes). Three potentially important trends, however, did emerge.

#### Rights-based approaches show promise

Some new evidence of the application of rights-based approaches having a positive impact on the provision of sanitation. In some instances this seemed to result in more sustainable, empowering and efficient results, especially in terms of reaching low-income consumers. Much evidence was provided from rural cases, e.g.

in South Asia, and there were some presentations from cities, such as Blantyre in Malawi. Disappointingly, few presenters linked the implementation of these approaches to treatment of wastewater and improvement of water quality, which represents an opportunity for the future.

#### More creative thinking on the ground

Several practical case studies presented during the Week provided benefits to human health and welfare in cities and to the environment. Examples included Decentralised Wastewater Treatment Systems (DEWATS) schemes in Kathmandu, which used human waste as a resource for biogas generation and reduced pressure on energy resources. In the Netherlands, innovative and long-term coastal protection schemes have been developed that harness natural processes in order to reduce risks urban residents, protect or restore biodiversity, and likely save money.

#### Water and sanitation planning looks into political economy

The failure to achieve desired human development outcomes in the sector over last decade has prompted a re-assessment of sector strategies and focus on the issues of governance and political economy. For instance, new initiatives from Kenya showed how information about the economic importance of the horticulture, agriculture, energy generation and tourism

industries around Naivasha – in terms of social and economic outcomes – could be used to bring greater political backing for action to improve management and allocation of water resources from Lake Naivasha. This work was informed by the development in recent years of new water footprinting methods. Similar approaches were presented, albeit using different tools, to understand strategic options for urban and rural water management in the Ganges basin particularly in relation to socio-economic outcomes relating to flood risk management, hydropower development and water storage.

### **What is needed to ensure human and environmental health in an urbanising world?**

Despite a number of encouraging examples of individual projects, policies and innovation, there was overwhelming evidence that the challenges of water, sanitation and hygiene, pollution and over-abstraction of water, ecosystem degradation and poor governance of water resources remain significant. Based upon what was, and what was not presented during the Week, the rapporteur team offers three priority areas to improve current efforts to safeguard, maintain and enhance human and environmental health.

#### **Innovative communication**

If we are to successfully reach out to linked sectors, to decision-makers in government and business and to the public, then

we need to understand, and use, the language of each of these audiences. An example of this was the “take a pee and get one rupee” initiative in Nepal. Using social media and cell phones to communicate on environmental and human health issues is one possibility for better public communication, such as the FAO Facebook application on the water footprint of your breakfast.

#### **Better data in the public domain**

If we are to tackle the water challenges of the 21<sup>st</sup> Century we need action at larger scales than has hitherto been the case. In order to mobilise the finance and political support to invest in human and environmental health we will need to provide better evidence, and improved socio-economic, hydrological and ecological data, that demonstrate what strategies, initiatives and interventions are needed most and will be able to best deliver the desired outcome. Remote sensing and internet applications promise improved data collection and access but it is not clear how different initiatives are being coordinated at national, regional and global scales.

#### **A stronger science, society, policy interface**

In this respect a key success factor will be humility on the part of specialist water professionals so that they can better blend their technical expertise with common sense, real-life experience. Humility will also be required between difference specialist disciplines – engineers, health professionals, city planners, en-



Photo: International Water Association



environmentalists, private sector managers – so that we can learn from each other. A key lesson emerging from some World Water Week sessions was the need to move from approaches based on deterministic control of society and nature to those based on “going with the flow”.

### **What steps can be taken right now to improve human and environmental health?**

In most cases and places, improved performances are needed from government, the private sector, and the NGO and scientific community. Each group could take immediate action to address the following priorities.

#### **Governments should combine soft and hard solutions**

In the crowded cities of tomorrow – especially those near rivers or on the coast where climate change may be felt most – we will not simply be able to build our way out of trouble. More cost-effective, efficient and sustainable solutions are required. When designing policy and outlining project terms of reference, governments must consider how to optimise the blend of environmental, social and engineering solutions in order to deliver socio-economic outcomes including health, economic development and environmental sustainability.

#### **Private sector strategies to target low-income consumers in urban areas**

The private sector needs to regard the urban poor as low-income consumers who are likely to be the middle-income consumers of tomorrow. Investing in water, environmental and health infrastructure products and services can help to build the markets of tomorrow and offers scope for innovation.

#### **NGOs need to make comprehensive links between disciplines and continue to provide examples of what works for environmental and human health**

Greater focus on urban areas may be justified and they should continually strive to advocate alternative solutions across silo boundaries using a stronger evidence base for desired policy change. NGOs should also move from a “pilot project paradigm” to strategies based on achieving results at scale. This will often require a rethink of project design with as much, if not more, attention paid to the information needs of decision-makers in business and government as to the local recipients of direct project benefits.

#### **Focus science on knowledge application**

The scientific community can make better connections with real life problems and work towards a solution which is in the interest of all, especially the poor. Simply publishing academic papers no longer suffices as a means of communicating important scientific evidence of what works.

### **Reflections from the rapporteurs**



**Lead rapporteurs: Dave Tickner and Anjal Prakash,**

#### **Too many pilots, too little flying**

Perhaps the greatest ongoing challenge is that of moving beyond individual pilot projects to implementing solutions at scale. No matter how innovative and successful a case study is, if insufficient attention is given during project design stages to communication, advocacy and spreading lessons to high level decision-makers, we are simply scratching the surface. To this end, it was disappointing to hear relatively little about how the water community can overcome barriers to scaling-up approaches.

#### **Pro-poor approaches are needed, but what are they?**

A critical analysis is needed to understand this on what pro-poor approaches are and which practices are not. Even within the sessions that looked directly at approaches that were labelled “pro-poor”, there was hardly an agreement on whether the approaches presented were pro-poor at all.



Photo: International Water Association

# Urban Areas in a Landscape Context

**Lead rapporteurs: Pieter van der Zaag and Jenny Fredby**

**Junior rapporteurs: Doris van Halem, Malin Folkesson, Lan Wang and Rodrigue Dedessus le Moutier**

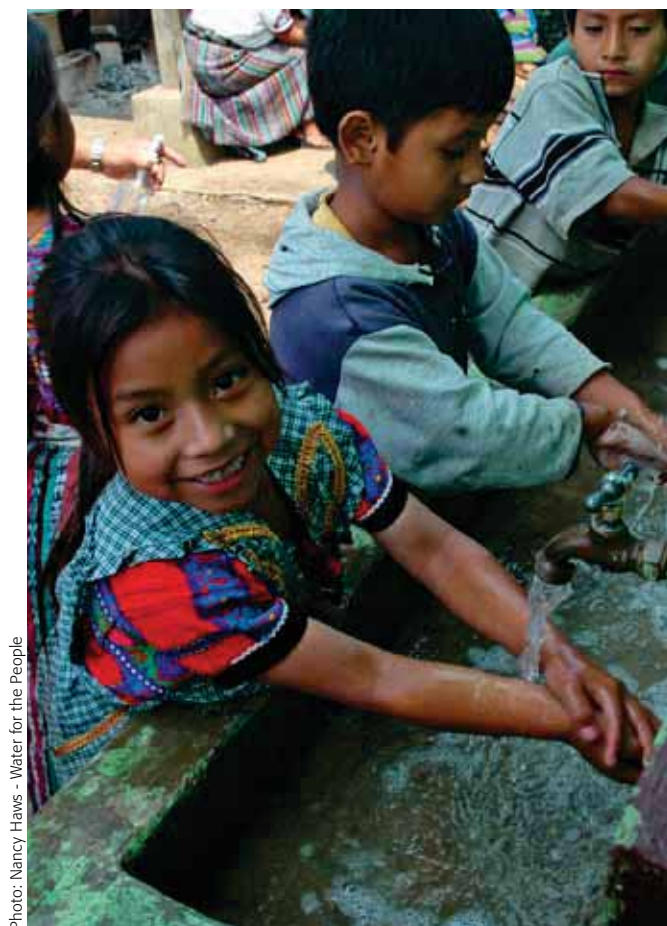


Photo: Nancy Haws - Water for the People

The majority of the world's population now lives in cities or towns. This places an increased focus on the demand for and availability of safe and sustainable water resources and adequate sanitation and wastewater treatment systems. Understanding the complex physical, political, economic and social landscape which surrounds, stimulates and defines each city is paramount for planning sustainable paths for urban growth. Urban areas should be viewed as landscapes with specific natural and cultural characteristics that are largely human-made. Urban spaces have their specific metabolism – where energy, water, food and other materials are transformed. After attending over 50 sessions and hundreds more presentations that looked into the challenges and opportunities for water in an urbanising world, the rapporteur team compiled the most poignant insights and latest approaches to manage urban areas within a landscape context.

## **What were the most important new trends in the nexus between urban management and water resource management and service provision shared during the week?**

Three general very positive new developments could be seen throughout the discussions at the World Water Week.

### **New approaches to address all phases of the water cycle in the urban landscape...**

While Integrated Urban Water Management (IUWM) is not a new concept or practice, several examples were presented from cities across the world that were successfully engaging in approaches to integrate water supply, transport, housing, urban drainage, flood plain zoning, forecasting, stormwater harvesting, wastewater reuse policy and planning.

### **...and to involve other sectors in managing the water resources**

Perhaps the best and most concrete example of this shared during the Week came from Bangladesh, where provision for rainwater harvesting is mandatory in all new buildings.

### **Promising tools to map and monitor the use and state of infrastructure and access to services in urban slums**

Inadequate data on the number and status of water and sanitation services in many urban areas makes it impossible to understand the scale of the problem and hampers targeted strategies for improvements in levels of access to services. A number of new innovations to map and monitor infrastructure and service provision in informal settlements are now available to target this long-standing barrier to improving access to safe water and sanitation in urban settings.

## **In short**

### **What were the most important new trends in the nexus between urban management and water resource management and service provision shared during the week?**

- New approaches to address all phases of the water cycle in the urban landscape and to involve other sectors in managing the water resources
- Promising tools to map and monitor the use and state of infrastructure and access to services in urban slums

### **What is needed to ensure sustainable urban growth in a landscape context?**

- Multi-disciplinary knowledge and analysis
- Plans to address, not ignore, uncertainty
- Strategies for aging infrastructure

### **What can be done right now?**

- Choose technologies to tap synergies
- Connect urban development to the basin
- Where appropriate, build on existing informal networks of service providers
- Push thinking out the water box and beyond the city limits



## What is needed to ensure sustainable urban growth in a landscape context?

Multiple presentations made during the Week returned to the following three priorities for more water-secure and equitable cities.

### Multi-disciplinary knowledge and analysis

Many urban settlements are unplanned, densely populated and unserved by even the most basic water and sanitation infrastructure. There is currently inadequate data on the number and status of water and sanitation services in many urban areas, making it impossible to understand the scale of the problem. Monitoring must be improved to ensure sufficient money, expertise and technical resources are directed to the areas of need in urban settings and small towns. We need an increasing focus on the reasons behind the variations and inequities in access within the urban landscape. While the technical solutions often exist – more knowledge is needed on blockages in the political, economic and social landscape of urban areas, causing inequity and exclusion of large numbers of people from access to safe water and adequate sanitation. Deeper and wider knowledge on the political, economic and social landscape of urban areas helps to better understand persistent trends of inequity and the exclusion of large numbers of people from access to safe water and adequate sanitation. This includes improved analyses of the rights, responsibilities and competing demands between

urbanites and rural dwellers for water and how their different needs can be reconciled in an equitable manner.

### Plans to address, not ignore, uncertainty

Many cities grow fast through push and pull factors. Providing adequate services is difficult in such evolving spaces, and poses important planning challenges. How a given neighbourhood will evolve is uncertain and may be driven by population dynamics, markets, climate, policies and politics, among others. New approaches in urban planning that are able to account for uncertainty of future developments in terms of climate, demography and economy, and incorporate lifecycle analysis of existing or new infrastructure are needed for cities and towns. As a concrete example of how to deal with this, decentralised modular sanitation schemes have been proposed as a solution that can be scaled up and connected to evolve into larger centralised systems if needed in the future.

### Strategies for aging infrastructure

Significantly more attention is needed on how best to manage aging infrastructure. More accurate and efficient leakage detecting devices are being developed. 'Smart water grids' can for example be developed. An immediate priority is to combine current utility assets inventory with replacement strategies based on a range of criteria, including local soil conditions, the materials of pipes etc. An important issue for public utilities



Photo: Société des Eaux de Marseille

## Reflections from the rapporteurs



Lead rapporteurs: Pieter van der Zaag and Jenny Fredby

### Access and equity are the greatest urban challenges

Water scarcity within the physical urban landscape is a growing concern, but the immediate crisis faced right now is the inadequate and inequitable access of clean water for poor people. Improving access to water and sanitation is essential to building resilience to climatic variability for hundreds of millions of urbanites around the world.

### Re-valuing of public spaces in urban development

Cities are dynamic places with dense social interactions where people enter and exit, exchange, transact, earn, learn and innovate. Streets as public spaces play crucial enabling roles for human interaction and development. Not only that, streets allows infrastructure networks to evolve and they therefore need sufficient room, something which is often lacking in dense informal settlements. This poses a tremendous challenge and needs to be kept in mind in order to develop thinking and planning for urban development, where a re-valuing of public spaces is central.

is to analyse and decide on what time span to have in mind when designing and constructing adaptable and resilient water infrastructure for the future.

### What can be done right now?

The rapporteur team identified four key opportunities for urban development strategies to cope with the constantly evolving urban landscape.

#### Choose technologies to tap synergies

Technological solutions that will work best will be those that benefit more than one sector. Innovations should aim to build on potential synergies of water, sanitation, and energy for agricultural and urban users. While different solutions and technologies at different scales may be best in different contexts, avoiding the mixing of different types of wastewater flows appears a universal recommendation and a promising starting point.

#### Connect urban development to the basin

We should better explore the potential role of cities and urban areas in river basin management and planning, including

transboundary water management processes. Cities are likely to increasingly exert pressure on water-resources and ecosystems further away, with implications both for populations of surrounding areas and city dwellers.

#### Where appropriate, build on existing informal networks of service providers

Existing informal arrangements and networks, such as local water and waste entrepreneurs, can in some contexts be appropriate entry points to accelerate sustainable services in slum areas, as for example through wastewater recovery products.

#### Push thinking out the water box and beyond the city limits

Water professionals must move the discourse beyond integrated water resource management and focus on identifying the best opportunities and inroads to integrate the water sector in other sectors of society. In urban areas, those involved in the management of water must look beyond the city limits at the water, energy and food fluxes that move into and through the city, as well as the social networks that extend far beyond. Great gains are achieved through smarter and synergistic management of these fluxes. In some cases this requires applying new technologies but often tested methods suffice. Cities facing or approaching scarcity especially must slow down the urban hydrological cycle by retaining, recharging, reusing and recovering more of the water resources. Over time, this may improve the quality of life and the environment and the economy.



Photo: SXC



# The Stockholm Statement to the Rio+20 Summit

Photo: Vaughan Willis

Water is the bloodstream of the green economy. Water, energy, and food are interlinked and interdependent; securing them is central to alleviating poverty and to creating a climate resilient and robust green economy. Population growth, expanding cities and accelerating economic activity increase the demand for energy and food and create unsustainable pressure on our water and land resources. By 2030, in a business as usual scenario, humanity's demand for water could outstrip supply by as much as 40 percent. This would place water, energy and food security at risk, increase public health costs, constrain economic development, lead to social and geopolitical tensions and cause lasting environmental damage.

The United Nations Conference on Sustainable Development in Rio de Janeiro in June 2012 (Rio+20 Summit) provides an opportunity for global leadership to harness economic activity at all levels to create new and sustainable development and eradicate poverty. The foundation for a resource efficient green economy must be built upon water, energy and food security – and these issues must be addressed in an integrated, holistic manner that values the natural environment and recognises the carrying capacity of the planet. Action is critical at all levels to address inequities, especially for the 'bottom billion' who live in slums and impoverished rural areas and survive without access to safe drinking water, adequate sanitation, sufficient food and energy services. It is imperative to ensure that adequate water and sanitation services are available to the world's population in accordance with the resolution of the UN General Assembly declaring these as a human right.

Accordingly, over and above achieving the Millennium Development Goals, we call for a universal provisioning of safe drinking water, adequate sanitation and modern energy services by the year 2030.

We call on local, municipal, and national governments and all major groups participating at the Rio+20 Summit to commit to achieving the following intervening targets by 2020:

- 20 percent increase in total food supply-chain efficiency; reduce losses and waste from field to fork

- 20 percent increase in water efficiency in agriculture; more nutrition and crop per drop
- 20 percent increase in water use efficiency in energy production; more kWh per drop
- 20 percent increase in the quantity of water reused
- 20 percent decrease in water pollution

In addition, we strongly urge that the following outcomes feature prominently within the Rio+20 Summit's thematic focus areas:

- i. Green economy in the context of sustainable development and poverty eradication
  - All governments commit to sufficient investments in safe drinking water and sanitation services and hygiene education for its people
  - The current measurements of economic performance are expanded and complemented by indicators on environmental and social sustainability
  - Economic and social incentives are created to promote water use efficiency and protect freshwater ecosystems
- ii. Creating an institutional framework for sustainable development
  - Commit to policy and institutional reforms that create an enabling environment for the coherent and integrated management of water, energy and food
  - Enact national legislation that guarantees access to water and sanitation for all and protect freshwater ecosystems
  - Create cross-cutting frameworks that bridge ministries and sectors, leading the way to water, energy and food security in a green economy

The achievement of the aforementioned targets and outcomes would help the global leaders assembled at the Rio+20 Summit to deliver a new model of human and economic development and ensure a real impact on human well-being across the world.



# Convening Organisations

- Acacia Water (Acacia)
- African Ministers' Council on Water (AMCOW)
- Agence Française de Développement (AFD)
- Alliance for Global Water Adaptation (AGWA)
- Alliance for Water Stewardship (AWS)
- American Forest and Paper Association (AF&PA)
- Aqua for All
- AquaFed
- Arabic Countries Water Utilities Association (ACWUA)
- Asian Development Bank (ADB)
- Asian Disaster Preparedness Centre (ADPC)
- Asia Pacific Water Forum (APWF)
- Asociación Estatal de Operadores Públicos de Agua y Saneamiento (AEOPAS)
- Association of NGOs in Zanzibar (ANGOZA)
- Associazione di Cooperazione Rurale in Africa e America Latina (ACRA)
- Athi Water Services Board (Kenya)
- Black & Veatch Corporation (B&V)
- Building Partnerships for Development in Water and Sanitation (BPD)
- Cap-Net – Capacity Building for Integrated Water Resources Management
- Center for Environmental Planning and Technology University, India (CEPT)
- Centre for Science and Environment (CSE)
- CEO Water Mandate
- Ceres
- Chinese Academy of Agricultural Sciences (CAAS)
- City of Uusikaupunki, Finland
- Clean Water America Alliance (CWA)
- Confederation of European Paper Industries (CEPI)
- Conference of Ibero-American Water Directors (CODIA)
- Conservation International (CI)
- Co-operative Programme on Water and Climate (CPWC)
- Council for Scientific and Industrial Research (CSIR)
- Delft Urban Water Center
- Department of Water Affairs, Republic of South Africa (DWA)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- Doga Dernegi
- EU Commission
- European Federation of National Associations of Water and Wastewater Services (EUREAU)
- European Investment Bank (EIB)
- European Water Partnership (EWP)
- EUWI Africa Working Group (EUWI-AWG)
- EUWI Finance Working Group (EUWI-FWG)
- Federal Institute for Geosciences and Natural Resources, Germany (BGR)
- Federal Ministry for Economic Cooperation and Development, Germany (BMZ)
- Federal Ministry for Environment, Nature Conservation and Nuclear Safety (BMU)
- FEMSA Foundation
- Finnish Environment Institute (SYKE)
- Finnish Ministry for Foreign Affairs
- Food and Agriculture Organization of the United Nations (FAO)
- France's Governing Member of the International Water Association (ASTEE)
- French National Committee (AFEID) of International Commission on Irrigation and Drainage (ICID)
- Freshwater Action Network (FAN)
- Gender and Water Alliance
- Global Environmental Flows Network (eFlowNet)
- Global Environmental Management Initiative (GEMI)
- Global Water Operators Partnerships Alliance (GWOPA)
- Global Water Partnership (GWP)
- Global Water System Project (GWSP)
- Government of Korea
- Groundwater Management Advisory Team (GW-MATE)
- Health Alliance International
- Helmholtz Centre for Environmental Research (UFZ)
- Ingeniería Sin Fronteras, Catalunya (ISF)
- Institut International de l'Eau et de l'Assainissement (ONEP Maroc)
- Institute for Human Rights and Business (IHRB)
- Institute for the Analysis of Global Security (IAGS)
- Inter-American Development Bank (IDB)
- International Council of Forest and Paper Associations (ICFPA)
- International Development Research Center (IDRC) Canada
- International Federation of Red Cross and Red Crescent Societies (IFRC)
- International Finance Corporation (IFC)
- International Forum Committee of the 6th World Water Forum
- International Fund for Agricultural Development (IFAD)
- International Institute for Environment and Development (IIED)
- International Union for Conservation of Nature (IUCN)
- International Water Association (IWA)
- International Water Management Institute (IWMI)
- International Water Resources Association (IWRA)
- IRC International Water and Sanitation Centre (IRC)
- ITT Corporation (ITT)
- ITT Watermark
- IWMI-TATA Policy Research Program
- Japan International Cooperation Agency (JICA)
- KfW Entwicklungsbank
- King's College London (KCL)
- Kuressaare College of Tallinn University of Technology
- London School of Hygiene & Tropical Medicine (LSHTM)
- McGill University, Canada
- MDG Achievement Fund (MDG-F)
- Mercy Corps
- Ministry of Foreign and European Affairs, France (MAEE)





Photo: Getty Images

- National Association for Clean Water Agencies (NACWA)
- National Water Commission of Mexico (CONAGUA)
- Natural Heritage Institute (NHI)
- Norges Bank Investment Management (NBIM)
- Norrtälje Municipality, Sweden
- Peking University, China (PKU)
- PepsiCo Foundation
- Pihlta Municipality in Saaremaa, Estonia
- Polytechnic School of the University of São Paulo (Poli-USP)
- Public Hygiene Lets Us Stay Human (PHLUSH)
- Public Services International (PSI)
- Rainwater Harvesting Implementation Network (RAIN)
- Ramsar Secretariat
- Reclaiming Public Water Network Transnational Institute (TNI)
- Research Institute for Humanity and Nature (RIHN)
- Royal Swedish Academy of Sciences (KVA)
- Sabin Vaccine Institute (Sabin)
- Sandia National Laboratory (SNL)
- Sanitation and Water for All (SWA)
- seecon
- Shack/Slum Dwellers International (SDI)
- SHARE Consortium
- Siemens Water Technologies Corporation (Siemens)
- South Asia Consortium for Interdisciplinary Water Resources Studies (SaciWATERS)
- South Asia Water Initiative (SAWI)
- Stockholm Environment Institute (SEI)
- Stockholm International Water Institute (SIWI)
- Stockholm Water Foundation (SWF)
- Sweden Textile Water Initiative (STWI)
- Swedish International Development Cooperation Agency (Sida)
- Swedish Water and Wastewater Association (SWWA)
- Swedish Water House (SWH)
- Swiss Agency for Development and Cooperation (SDC)
- Swiss Federal Institute of Aquatic Science and Technology (EAWAG)
- SWITCH
- The Cooperative Programme on Water and Climate (CPWC)
- The Nature Conservancy (TNC)
- Transparency International (TI)
- Twin2Go project
- UK Department for International Development (DfID)
- UNDP Water Governance Facility at SIWI (WGF)
- UNEP-DHI Centre on Water and Environment (UNEP-DHI)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- UNESCO – Institute for Water Education (UNESCO-IHE)
- UNESCO – International Hydrological Programme (UNESCO-IHP)
- UNESCO Etxea
- United Nations Capital Development Fund (UNCDF)
- United Nations Children's Fund (UNICEF)
- United Nations Development Programme (UNDP)
- United Nations Economic Commission for Europe (UNECE)
- United Nations Environment Programme (UNEP)
- United Nations Human Settlement Programme (UN-HABITAT)
- United Nations International Strategy for Disaster Reduction (UNISDR)
- United Nations Secretary-General's Advisory Board on Water and Sanitation (UNSGAB)
- United Nations World Water Assessment Programme (WWAP)
- United States Agency for International Development (USAID)
- USAID ECO-Asia
- United States Department of State
- United States Environmental Protection Agency, Office of Water (US-EPA)
- University of Dundee, UK
- University of Nebraska, Water for Food Institute, USA
- UN-Water
- UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC)
- UN-Water Decade Programme on Capacity Development (UNW-DPC)
- Uppsala University, Sweden
- WASH Advocacy Initiative
- WASTE Advisers on Urban Environment and Development (WASTE)
- Waste Enterprisers Ltd. (WE)
- Water and Climate Coalition (WCC)
- Water and Sanitation for the Urban Poor (WSUP)
- Water and Sanitation Program (WSP)
- Water Center for Latin America and the Caribbean (CAALCA)
- Water Environment Federation (WEF)
- Water Footprint Network (WFN)
- Water Integrity Network (WIN)
- Water Observatory – Botin Foundation
- Water Supply and Sanitation Collaborative Council (WSSCC)
- Water.org
- WaterAid
- WaterLex
- Wetlands International (WI)
- WETWin Consortium
- Women of Europe for a Common Future (WECF)
- World Agroforestry Organisation (ICRAF)
- World Bank (WB)
- World Business Council for Sustainable Development (WBCSD)
- World Economic Forum (WEF)
- World Health Organization (WHO)
- World Meteorological Organization (WMO)
- World Resources Institute (WRI)
- World Toilet Organization (WTO)
- World Water Council (WWC)
- World Wide Fund for Nature (WWF)
- Zanzibar Water Authority (ZAWA)
- Östhammar Municipality, Sweden

## 2011 Stockholm Water Prize



Photo: Cecilia Österberg

Professor Stephen R. Carpenter received the 2011 Stockholm Water Prize on August 25 from the hands of H.M. Carl XVI Gustaf of Sweden.

Stephen R. Carpenter, Professor of Zoology and Limnology at the University of Wisconsin-Madison, USA, received the 2011 Stockholm Water Prize from the hands of H.M. King Carl XVI Gustaf of Sweden for his groundbreaking research that showed how lake ecosystems are affected by the surrounding landscape and human activities.

Professor Carpenter is known as one of the world's most influential environmental scientists in the field of ecology. His findings have formed the basis for concrete solutions on how to manage lakes. By combining theoretical models and large-scale lake experiments he has reframed our understanding of freshwater environments and how lake ecosystems are impacted by humans and the surrounding landscape. Professor Carpenter is best known for his research on trophic cascades in lakes – a concept which describes how impacts on any species in an ecosystem will cascade down, or up, the food chain.

The Stockholm Water Prize Nominating Committee emphasised the importance of Professor Carpenter's contributions in helping us understand how we affect lakes through nutrient loading, fishing, and introduction of exotic species. "Professor Carpenter has shown outstanding leadership in setting the

ecological research agenda, integrating it into a socio-ecological context, and in providing guidance for the management of aquatic resources," noted the Stockholm Water Prize Nominating Committee.

### About the Stockholm Water Prize

The Stockholm Water Prize is a global award founded in 1991 and presented annually by the Stockholm International Water Institute to an individual, organisation or institution for outstanding water-related activities. The Stockholm Water Prize Laureate receives USD 150,000 and a crystal sculpture specially designed and created by Orrefors.

Founders of the Stockholm Water Prize are Swedish and international companies in collaboration with the City of Stockholm. They are: Bacardi, Borealis & Borouge, DuPont, Europeiska Insurance, Fujitsu, Grundfos Management, Hewlett Packard, ITT Water & Wastewater, Kemira, KPMG Sweden, Läckeby Water, P&G, Ragn-Sells, Saab Automobile AB, Scandic, Scandinavian Airlines (SAS), Siemens AG, SJ (Swedish Railways), Snecma/Safran, Uponor, Water Environment Federation and Ålandsbanken Sverige.



# 2011 Stockholm Junior Water Prize

Ms. Alison Bick, USA, received the 2011 Stockholm Junior Water Prize from the hands of H.R.H. Crown Princess Victoria of Sweden at a ceremony that took place during the World Water Week in Stockholm. The American teen has developed a low-cost portable method to test water quality – using a mobile phone.

Alison worked for four years on her project, which combines micro-fluidic devices, cell-phones, and chemical indicators to evaluate water quality. Her innovative method does not only accurately assess the bacteria content of water. It is both significantly faster and up to 200 times less expensive than standard testing procedures.

In its citation, the International Jury stated that the project "has the potential to revolutionise our ability to monitor water quality in a way that is fast, accurate, more flexible and less expensive than existing technologies."

The international Stockholm Junior Water Prize competition brings together thousands of participants in over 28 countries. The representatives at the international final held during the World Water Week in Stockholm are the winners of national competitions that fielded over 9,000 submitted projects this past year.

## Excellence Diploma to Sri Lanka

A Diploma of Excellence was given to Mr. Prasan Warnakula from Sri Lanka for his project "From pollutant to pulp: industrial

symbiosis of textile finishing, paper recycling and pulp production," which was honoured as a real world example of industrial symbiosis in a developing country.

## About the Stockholm Junior Water Prize

The competition is open to young people between 15–20 years of age, who have conducted water-related projects focusing on local, regional, national or global topics of environmental, scientific, social or technological importance. As a result of the competitions, thousands of young people around the world develop personal interests, undertake academic study, and often pursue careers in the water or environmental fields. The winner receives an award of USD 5,000 and a handmade blue crystal sculpture. The Stockholm International Water Institute administers the competition, which is sponsored globally by ITT Corporation. The official suppliers for the competition are Infobahn, Halebop, Hertz, People Travel Group and Trosa Tryckeri.

2011 marked the 15<sup>th</sup> anniversary of the international Stockholm Junior Water Prize programme. H.R.H. Crown Princess Victoria of Sweden is the Patron of the Stockholm Junior Water Prize.



Ms. Alison Bick receives the prize from H.R.H. Crown Princess Victoria of Sweden at the award ceremony.

Photo: Cecilia Österberg

# 2011 Stockholm Industry Water Award



Photo: Cecilia Österberg

Mr. Peter Forssman (right), Chairman of the Stockholm International Water Institute, hands the Stockholm Industry Water Award diploma to Mr. Peter Brabeck-Letmathe, Chairman of Nestlé on August 24.

Nestlé received the 2011 Stockholm Industry Water Award for its leadership and performance to improve water management in its internal operations and throughout its supply chain.

Over the past decade, Nestlé has reduced total water withdrawals by over 30 percent, more than doubled the water efficiency of their internal operations and made significant reductions in the quantity of wastewater discharged into the environment. The Award also recognises Nestlé's work to improve the water management of its suppliers, which includes over 25 million people who are involved in its entire value chain.

## About the Stockholm Industry Water Award

The Stockholm Industry Water Award recognises the business sector's contribution to sustainable water management, by minimising water consumption and environmental impact. It is given to any sector of business and industry. The Award was established in 2000 in collaboration with the Royal Swedish Academy of Engineering Sciences and the World Business Council for Sustainable

Development. An independent award committee, composed of leading professionals and academics of water sciences, reviews all submissions and selects the winner following an open nomination process.

# 2011 Best Poster Award

At the Closing Plenary of the 2011 World Water Week in Stockholm, Ms. Aishwarya Nandhini Elangovan and Mr. Anuthaman N G from the Centre for Water Resources, Anna University, India received the best poster award for their presentation, "Rapid urbanization and associated sociological impact due to flooding in an urban regime".

The authors presented an integrated flood assessment modeling framework to quantify the sociological damages and the associated costs due to flooding. By combining hydrological analysis and sociological survey and stakeholders' discussion, they were able to identify implementable structural measures to control the flood and reduce its impact on the exposed urban population and to recommend policy responses.



Photo: Mikael Ullén

Ms. Aishwarya Nandhini Elangovan received the best poster award from Dr. Akiça Bahri, member of the Scientific Programme Committee on August 26.





## 2011 World Water Week Supporters and Sponsors





# Overarching Conclusions

## World Water Week in Stockholm

### **Building Capacity – Promoting Partnership – Reviewing Implementation**

The World Water Week in Stockholm, organised by the Stockholm International Water Institute, is the leading annual global meeting place for capacity-building, partnership-building and follow-up on the implementation of international processes and programmes in water and development. It includes topical plenary sessions and panel debates, scientific workshops, independently organised seminars and side events, exhibitions and festive prize ceremonies honouring excellence in the water field. Stockholm is the meeting place for experts from businesses, governments, the water management and science sectors, inter-governmental organisations, non-governmental organisations, research and training institutions and United Nations agencies.

[www.worldwaterweek.org](http://www.worldwaterweek.org) • [www.siiwi.org](http://www.siiwi.org)



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